# MEASUREMENT ERROR OBTAINED DUE TO THE USE OF NO$_2$ EXPOSURE ESTIMATED INSTEAD OF MEASURED

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**Background and Aims:** Given the large costs and the lack of light measurement devices to measure individual exposure to certain pollutants, it is very common in epidemiology to estimate the exposure to pollution using models based on ambient measurements. This estimation does not usually take account of uncertainties that may lead to attenuation of the effect, bias and loss of power. The aim of this study was to compare the results of a traditional analysis with those obtained when using a model that incorporates the uncertainty of all modelling steps.

**Methods:** The INMA birth cohort study in Sabadell includes 657 pregnant women from whom information from questionnaires is collected at 12 and 32 weeks of pregnancy and at delivery. NO$_2$ measurements used to develop a land use regression (LUR) model are made at 57 sites in the city, and are supplemented by personal, home-indoor and home-outdoor measurements for 57 cohort subjects. We developed linear regression model of personal exposures to NO$_2$ for all women. We first modelled subjects' home-outdoor concentrations as a function of the LUR outputs, and home-indoor as a function of information provided by questionnaires (gas cooking, ventilation, etc.). These two predictions then fed into the personal exposure model. We compare a frequentist approach to a Bayesian modelling approach accounting for uncertainty.

**Results:** Estimations obtained for personal NO$_2$ for both methods were similar. The only observed differences between both approaches were observed at the standard deviation of the coefficients estimates. Higher values were obtained through the bayesian model (0.43 and 0.66 for outdoor and indoor NO$_2$, respectively) than for the linear model (0.27 and 0.53).

**Conclusions:** Although no good predictive models were obtained for either of the two methods, the bayesian approach seemed to better incorporate the uncertainty associated to the various modelling steps.